

IN THE CLAIMS

1. (Currently Amended) A system for correcting ink droplet placement errors in a recording apparatus, comprising:

a recording apparatus recording images on a recording medium which is conveyed in a first direction past discharging ink droplets from a recording head part to the recording medium, the recording head part having a plurality of recording heads arranged in the first direction, the recording heads having a plurality of recording head arrays, the recording head arrays having a plurality of recording head units arranged in a second direction perpendicular to the first direction, the recording head units having an ink discharging surface;

an identifying unit for identifying ink droplet placement errors by the recording head units in the first direction; and

a controlling unit for controlling timing to discharge ink droplets by the recording head units to reduce ink droplet placement errors based on the errors;

wherein the controlling unit controls timing to discharge ink droplets roughly based on a printing pulse and controls timing to discharge the droplets finely based on a controlling pulse having a higher frequency than that of the printing pulse.

2. (Previously Presented) The system according to claim 1, wherein the identifying unit includes a reading unit for reading images on a recording medium, the images being printed by

the recording head part; a detecting unit for detecting the ink droplet placement errors in the first direction by each of the recording head units based on the reading images provided by the reading unit, and the controlling unit controls the timing based on the errors provided by the detecting unit.

3. (Previously Presented) The system according to claim 2, wherein the recording head units are disposed in a staggered arrangement, the detecting unit further detects ink droplet placement errors of the recording head arrays, and the controlling unit further controls timing to discharge ink droplets from the recording head units based on the errors provided by the detecting unit.

4. (Previously Presented) The system according to claim 3, wherein the detecting unit further detects ink droplet placement errors of the recording heads in the first direction, and the controlling unit further controls timing to discharge ink droplets from the recording head units of each of the recording heads to reduce the errors based on the errors provided by the detecting unit.

5. (Currently amended) A system for correcting ink droplet placement errors in a recording apparatus, comprising:

a recording apparatus recording images on a recording medium which is conveyed in a first direction past discharging ink droplets from a recording head part to the recording medium, the recording head part having a plurality of recording heads in the first direction, the recording heads having a plurality of recording head arrays, the recording head arrays having a plurality of recording head units in a second direction perpendicular to the first direction, the recording head units having an ink discharging surface;

an identifying unit for identifying ink droplet placement errors by the recording head arrays in the first direction; and

a controlling unit for controlling timing to discharge ink droplets by the recording head units to reduce the errors based on the errors;

wherein the controlling unit controls timing to discharge ink droplets roughly based on a printing pulse and controls timing to discharge the droplets finely based on a controlling pulse having a higher frequency than that of the printing pulse.

6. (Previously Presented) The system according to claim 5, wherein the identifying unit includes a reading unit for reading images on a recording medium, the images being printed by the recording head part; a detecting unit for detecting the ink droplet placement errors in the first direction provided by each of the recording heads based on the reading images provided by the reading unit, and the controlling unit controls the timing based on the errors provided by the detecting unit.

7. (Previously Presented) The system according to claim 6, wherein the recording head units are disposed in a staggered arrangement, the detecting unit further detects ink droplet placement errors provided by the recording heads in the first direction, and the controlling unit further controls timing to discharge ink droplets from the recording head units of the recording head arrays to reduce the errors based on the errors by the detecting unit.

8. (Currently Amended) A system for correcting ink droplet placement errors in a recording apparatus, comprising:

a recording apparatus recording images on a recording medium which is conveyed in a first direction past discharging ink droplets from a recording head part to the recording medium, the recording head part having a plurality of recording heads, the recording heads having a plurality of recording head arrays in the first direction, the recording head arrays having a plurality of recording head units in a second direction perpendicular to the first direction, the recording head units being disposed in a staggered arrangement, the recording head units having an ink discharging surface,

an identifying unit for identifying ink droplet errors by the recording heads in the first direction; and

a controlling unit for controlling timing to discharge ink droplets by the recording head units to reduce ink droplet placement errors based on the errors;

wherein the controlling unit controls timing to discharge ink droplets roughly based on a printing pulse and controls timing to discharge the droplets finely based on a controlling pulse having a higher frequency than that of the printing pulse.

9. (Previously Presented) The system according to claim 8, wherein the identifying unit includes a reading unit for reading images on a recording medium, the images being printed by the recording head part; a detecting unit for detecting the ink droplet placement errors in the first direction by the recording head arrays based on reading images provided by the reading unit, and the controlling unit controls timing based on the errors provided by the detecting unit.

10. (Previously Presented) An apparatus for correcting ink droplet placement errors in a recording apparatus, the recording apparatus recording images on a recording medium which is conveyed in a first direction past discharging ink droplets from a recording head part to the recording medium, the recording head part having a plurality of recording heads, the recording heads having a plurality of recording head arrays in the first direction, the recording head arrays having a plurality of recording head units in a second direction perpendicular to the first direction, the recording head units being disposed in a staggered arrangement, the recording head units having an ink discharging surface, the apparatus for correcting ink droplet placement errors comprising:

an identifying unit for identifying ink droplet errors by the recording heads in the first

direction, the identifying unit including a reading unit for reading images on a recording medium, the images being printed by the recording head part, and a detecting unit for detecting the ink droplet placement errors in the first direction by the recording head arrays based on reading images provided by the reading unit; and

a controlling unit for controlling timing to discharge ink droplets by the recording head units to reduce ink droplet placement errors based on the errors,

wherein the controlling unit controls timing based on the errors provided by the detecting unit to discharge ink droplets roughly based on a printing pulse and controls timing to discharge the droplets finely based on a controlling pulse, wherein the controlling pulse has a higher frequency than that of the printing pulse.

11. (Original) The apparatus according to claim 10, wherein the printing pulse controls the timing to record on the medium for every line in the first direction.

12. (Currently Amended) A system for correcting ink droplet placement errors in a recording apparatus, comprising:

a recording apparatus for recording images on a recording medium which is conveyed in a first direction by past discharging ink droplets from a recording head part to the recording medium, the recording head part having a plurality of recording heads, the recording heads

having a plurality of recording head arrays in the first direction, the recording head arrays having a plurality of recording head units in a second direction perpendicular to the first direction, the recording head units being disposed in a staggered arrangement, the recording head units having a ink discharging surface,

an identifying unit for identifying ink droplet placement errors by the recording head units, the recording head arrays, and recording heads in the first direction; and

a controlling unit for controlling timing to discharge ink droplets by the recording head units to reduce ink droplet placement errors in the first direction based on a first ink droplet placement error provided by the recording head units, a second ink droplet placement error provided by the recording head arrays, and a third ink droplet placement error provided by the recording heads;

wherein the controlling unit controls timing to discharge ink droplets roughly based on a printing pulse and controls timing to discharge the droplets finely based on a controlling pulse having a higher frequency than that of the printing pulse.

13. (Previously Presented) An apparatus for correcting ink droplet placement errors in a recording apparatus, the recording apparatus for recording images on a recording medium which is conveyed in a first direction past discharging ink droplets from a recording head part to the recording medium, the recording head part having a plurality of recording heads, the recording heads having a plurality of recording head arrays in the first direction, the recording head arrays

having a plurality of recording head units in a second direction perpendicular to the first direction, the recording head units being disposed in a staggered arrangement, the recording head units having a ink discharging surface, comprising:

an identifying unit for identifying ink droplet placement errors by the recording head units, the recording head arrays, and recording heads in the first direction;

a controlling unit for controlling timing to discharge ink droplets by the recording head units to reduce ink droplet placement errors in the first direction based on a first ink droplet placement error provided by the recording head units, a second ink droplet placement error provided by the recording head arrays, and a third ink droplet placement error provided by the recording heads;

wherein the identifying unit includes a reading unit for reading images on the recording medium, the images being printed by the recording head part, a detecting unit for detecting the ink droplet placement errors in the first direction, the detecting unit having a first detecting unit for detecting the errors by the recording head units and a second detecting unit for detecting the errors by the recording head arrays and a third detecting unit for detecting the errors by the recording heads, based on the reading images provided by the reading unit, wherein the controlling unit controls timing based on the errors provided by the first or second or third detecting unit.

14. (Original) The apparatus according to claim 13, further comprising:

a first controlling board having the first detecting unit and the second detecting unit; and

a second controlling board having the third detecting unit and the controlling unit.

15. (Currently Amended) The system according to claim 12, wherein the identifying unit includes a first controlling controller unit for controlling the recording head units to discharge ink droplets from the surface of the recording head units, and a second controlling controller unit for controlling the timing to discharge ink droplets from the surface of the recording head units by controlling the first controlling controller unit, the controlling controller units being provided with each recording head array.

16. (Previously Presented) The apparatus according to claim 13, wherein the controlling unit includes a first controller unit for controlling the recording head units to discharge ink droplets from the surface of the recording head units, and a second controller unit for controlling the timing to discharge ink droplets from the surface of the recording head units by controlling the first controller unit, and

the apparatus further comprising a first controlling board having the first controller unit and the first detecting unit and the second detecting unit, and the second controlling board having the third detecting unit and the second controller unit.

17. (Currently Amended) A recording apparatus for recording images on a recording medium which is conveyed in a first direction past discharging ink droplets comprising:

a recording head part having a plurality of recording heads in a first direction,

a plurality of recording head arrays having a plurality of recording head units in a second direction perpendicular to the first direction, the recording head arrays being held by the recording head, the recording head units having an ink discharging surface and being disposed in a staggered arrangement;

an identifying unit for identifying a first and second and third error, corresponding respectively to the recording head units and head arrays and heads in the first direction; and

a controlling unit for controlling timing to discharge ink droplets by the recording head units to reduce ink droplet placement errors in the first direction based on the first error provided by the identifying unit corresponding to the recording head units, the second error provided by the identifying unit corresponding to the recording head arrays, and the third error provided by the identifying unit corresponding to the recording heads;

wherein the controlling unit controls timing to discharge ink droplets roughly based on a printing pulse and controls timing to discharge the droplets finely based on a controlling pulse having a higher frequency than that of the printing pulse.

18. (Currently Amended) A correcting method for correcting ink droplet placement

errors comprising the steps of:

detecting for a first ink placement error between recording head units arranged in a direction perpendicular to a recording medium conveying direction;

detecting for a second ink placement error between recording head arrays arranged in the recording medium conveying direction and respectively having a plurality of recording head units arranged in the direction perpendicular to the recording medium conveying direction; and

controlling timing to discharge the droplets from the recording head units to reduce the first ink placement error and the second ink placement error based on the detected first ink placement error and the detected second ink placement error;

wherein the timing of ink droplet discharge is controlled roughly by a printing pulse and finely by a controlling pulse having a higher frequency than that of the printing pulse.

19. (Currently amended) A system for correcting ink droplet placement errors in a recording apparatus, comprising:

a recording apparatus recording images on a recording medium which is conveyed in a first direction past discharging ink droplets from a recording head part to the recording medium, the recording head part having a plurality of recording head units having an ink discharging surface;

an identifying unit for identifying ink droplet placement errors by the recording head

units in the first direction; and

a controlling unit for controlling timing to discharge ink droplets by the recording head units to reduce ink droplet placement errors based on the errors, the controlling unit controls timing to discharge ink droplets roughly based on a printing pulse and controls timing to discharge the droplets finely based on a controlling pulse, wherein the controlling pulse has a higher frequency than that of the printing pulse.